What is claimed is:

CLAIMS

1. A saccadic-motion detection device comprised of an optical system for focusing light reflected or emitted from a subject's eye onto an optical navigation chip;

2. The optical navigation chip in claim 1 converts the incident light into digital representations of the movement or position of the eye, or both;

3. The detector of claim 1 can be configured to determine the rate of movement of the eye;

4. The detector of claim 1 can be configured to determine the angular position, speed, and acceleration of the eye;

5. The detector of claim 4 can be configured to compare the value of position, speed, and acceleration with a table associating known or standard conditions to those values determined from the subject's eye;

6. The detector of claim 4, wherein the condition can be reported among known conditions for normal or impaired conditions, due to at least one of intoxication, fatigue, dementia, delirium, psychosis, attention deficit, hyperactivity, depression, or mania;

7. The detector of claim 6, wherein the condition of intoxication can be determined that is caused by drugs, such as benzodiazepines, ethanol (alcohol) , barbiturates, narcotics, narcotic mixtures, and amphetamines;

8. The detector of claim 1 wherein the optical navigation chip is configured with the capability to provide position or motion information at greater than 1200 times per second;

9. The detector of claim 1 wherein the optical navigation chip is configured with the capability to provide position or motion information at between about 1200 and about 6000 times per second;

10. The detector of claim 1 wherein a mechanical frame is attached to the optical apparatus and the optical navigation chip so as to be grasped by hand;

11. The detector of claim 1 wherein a source of light is attached and configured to the subject's eye so the reflected light is received by the optical apparatus;

12. The detector of claim 11 wherein the source of light is configured to provide outside the visible spectrum for humans, including the near infrared;

13. The detector of claim 1 wherein the optical navigation chip contains an array of charge coupled devices (CCDs);

14. The detector of claim 1 wherein the subjects are creatures capable of saccadic eye motion, which includes humans and other animals;

15. A system for detecting saccadic eye movements comprised of a motion transducer using an optical apparatus configured to focus light received from a subject's eye, which then provides at least one indication of position or motion at different times;

16. The system of claim 15 that includes a light source to illumine the subject's eye, and a housing for the light source, a motion transducer, and an optical apparatus, and a housing, which can include a hand grip so that the entire device is readily portable;

17. A system for detecting saccadic eye movements, using a transducer configured to receive light at two points in time, and then determine the magnitude and a direction of motion, using a processor coupled to the motion transducer and configured to process and report movement information;

18. The system of claim 17 configured to provide information on position and movement at a frequency of at least about 1200Hz;

19. The system of claim 17 configured to provide information on magnitude and direction differences in two dimensions, for example up-down, left-right;

20. The system of claim 17 configured to provide information on magnitude and direction as either a positive integer, negative integer, or zero in each dimension;

21. The system of claim 17 configured for subjects who are creatures capable of saccadic eye motion, which includes humans and other animals;

22. A software for detecting and determining saccadic eye movements, using

information from a transducer configured to receive light at two points in time, and then determine the magnitude and a direction of motion, using code configured to process and report movement information;

23. The system of claim 22 configured to provide information on position and movement at a frequency of at least about 1200Hz;

24. The system of claim 22 configured to provide information on magnitude and direction differences in two dimensions, for example up-down, left-right;

25. The system of claim 22 configured to provide information on magnitude and direction as either a positive integer, negative integer, or zero in each dimension;

26. The system of claim 22 configured for subjects who are creatures capable of saccadic eye motion, which includes humans and other animals;

27. A method of processing saccadic motion metrics that the state of light reflected from a subject's eye at two points in time, then determines the difference, then computes a digital representation to indicate the angular position, rate, or acceleration of the subject's eye;

28. The method of claim 27 that can evaluate a condition of the subject, based on comparing known angular positions, rates, or accelerations to the subject's angular positions, rates, or accelerations;

29. The method of claim 27 that can help diagnose a disorder of the subject, based on comparing known angular positions, rates, or accelerations for disorders to the subject's angular positions, rates, or accelerations;

30. The method of claim 27 wherein the sequential times are no more than about $1/1200^{th}$ of a second apart;

31. The method of claim 27 which uses a finite computational method based on an optimization schema, wherein the determination of movement is accomplished by cross-correlating sequential readings from the transducer, so as to predict movement via an a ranking algorithm, which then reports the most likely magnitude of motion in each dimension, up-down, left-right;

32. The method of claim 27 which uses a finite computational method based

collapsing values of a two-dimensional array into rows and columns, which can be weighted for importance, then cross-correlates sequential readings, so as to predict the most likely magnitude of motion in each dimension, up-down, left-right;

33. The method of claim 27 which uses an image processing system based on an optimization schema, wherein the determination of movement is accomplished by cross-correlating sequential picture frames from the transducer, so as to predict movement via an a ranking algorithm, which then reports the most likely magnitude of motion in each dimension, up-down, left-right;

34. The method of claim 27 adapted for subjects who are creatures capable of saccadic eye motion, which includes humans and other animals.